Impact of income inequality on emigration: case of Lithuania and other new EU member states

Laurinavičius, Antanas; Laurinavičius, Algimantas; Laurinavičius, Alfredas

Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Empfohlene Zitierung / Suggested Citation:
Laurinavičius, A., Laurinavičius, A., & Laurinavičius, A. (2020). Impact of income inequality on emigration: case of Lithuania and other new EU member states. *Business, mangagement and economics engineering*, *18*(2), 265-281. https://doi.org/10.3846/bme.2020.12683

Business, Management and Education
ISSN 2029-7491 / eISSN 2029-6169
2020 Volume 18 Issue 2: 265–281
https://doi.org/10.3846/bme.2020.12683

IMPACT OF INCOME INEQUALITY ON EMIGRATION: CASE OF LITHUANIA AND OTHER NEW EU MEMBER STATES

Algimantas LAURINAVIČIUS [1*], Antanas LAURINAVIČIUS [1], Alfredas LAURINAVIČIUS [2]

[1]*Finance Department, Faculty of Economics and Business Administration, Vilnius University, Lithuania*
[2]*Vilnius Gediminas Technical University, Vilnius, Lithuania*

Received 10 May 2020; accepted 15 June 2020

Abstract. *Purpose* – The objective of the article is to analyse how income inequality affects population decisions on emigration.

Research methodology – Correlation and regression analysis are used to determine the relationship between the analysed social phenomena. Firstly, the correlation between income inequality (its change) and emigration rates is calculated. Secondly, the static and dynamic aspect is evaluated, as well as the influence of data delay (lag) on decision-making. Finally, a regression equation is constructed, showing how one variable affects the other.

Findings – The analysis identifies the conditions and severity of population income inequality that may influence their emigration decisions. On the one hand, the impact is more substantial in the crisis and post-crisis period, and, on the other, in the new EU member states.

Research limitations – Sensibility of emigration to different conditions like accessibility (i.e. the opportunity to emigrate freely, such as being a member of the Schengen area) and the income gap between countries of origin and destination is a major limitation of the article which should be examined more closely in later works.

Practical implications – The analysis of emigration problem and the identification of its possible links with income inequality would allow economists to assess *a priori* potential of various measures suggested in practice and, consequently, would allow for the more targeted formulation of the State economic policy.

Originality/Value – The novelty of the article is defined by insufficient scientific research of relationships between income inequality and emigration as socio-economic phenomena within the new EU member states. A scientific analysis of the problem of emigration and the identification of its possible links with income inequality would contribute to a more detailed study of the scientific aspects of emigration and income inequality.

Keywords: income inequality, emigration, subjective well-being.

JEL Classification: D63, D86, O15.

*Corresponding author. E-mail: *algimantas.laurinavicius@evaf.vu.lt*

Introduction

The admission of Lithuania as well as the other Eastern and Central European countries to the European Union consolidated the principle of the rule of law, enhanced the processes of establishing democratic principles and civil society and significantly accelerated the economic development of the country. The average monthly salary in the national economy has increased by 5 times in the last 20 years (and even by 15 times in the previous 25 years) (Statistics Lithuania, 2020). Gross domestic product per capita has increased by six times over the same period (20 years) while the ratio of gross domestic product per capita to the EU average has more than doubled in 20 years: that is from about 20% in 1995 up to 47% in 2018 at nominal value or from 36% in 1995 and up to 81% in 2018 in PPS (Eurostat, 2020). Considering this indicator, Lithuania lagged behind the EU average over the period 1995–2018 the most, while Estonia came second and Latvia ranked third.

However, despite strong income growth, mistrust in public institutions has increased. Under the European Values Study in 2016, only 40% of Lithuanians expressed confidence in their country's Parliament and 31% of the population expressed their confidence in political parties while the other European countries surveyed averaged respectively 56% and 40% (European Values Study, 2016). Such low levels of confidence in Lithuania indicate that the significant institutes of democratic civil society as the Government, political parties and Parliament have lost public confidence. It might be the cause of continued and even accelerated emigration from Lithuania despite impressive economic achievements (Laurinavičius et al., 2018).

French philosopher and educator J.-J. Rousseau in the 18th century pointed out that emigration may be caused by a crisis of confidence and growing inequality when citizens terminate their Social Contract with the state. "If, however, non-contributors appear in the making of a treaty, their non-participation does not destroy the treaty, but merely distinguishes them from there. They are foreigners between the citizens. Once the state is established, consent is in residence to live in the territory, and thus to surrender to sovereignty." (Rousseau, 2018b). Together in the 18th century the writer also gives one of the reasons leading to the termination of Social Contract that is to say emigration: "If you want to give the state some stability, bring the extreme angles as close together as possible, do not stand nor rich nor ragged. These two castes, inherent in nature, are equally disastrous for the common good, the panders of tyranny come out of one, and the tyrants come out of another caste. The freedom is traded between them: one sells it, and another buys it." (Rousseau, 2018a).

Moreover, not only these tips have not lost their relevance for more than two and a half centuries, they are just given to our state! (Although J.-J. Rousseau's work was entitled "Considerations on the Government of Poland and on its Proposed Reformation", it was addressed to the Republic of the Two Nations (the Kingdom of Poland and the Grand Duchy of Lithuania).

Thus, the objective of the article is to analyse whether income inequality has a statistically significant impact on emigration and how necessary change of income inequality is. Answers to these questions would not only allow for the more targeted formulation of the State economic policy, but it would also help to identify the most effective measures in reducing income inequality and its economic harm.

Thomas Piketty (2013) explores income inequality extensively in his fundamental work "Capital". However, his book focuses more on the United States, Western Europe and other developed countries while we foremost examine the impact of income inequality in Lithuania and other new member states of the European Union.

Thus, scientific importance and the problem of the article is defined by insufficient scientific research of relationships between income inequality and emigration as socio-economic phenomena in the new EU member states. A scientific analysis of emigration problem and the identification of its possible links with income inequality would allow scientists and economists, on the one hand, to assess *a priori* the potential of various measures suggested in practice and, on the other hand, to contribute to a more detailed study of emigration and income inequality.

In the article correlation and regression analysis are used to determine the relationship between the analysed social phenomena. The research starts with the analysis of links between the Gini coefficient of equivalized disposable income and emigration rates in 31 European countries (EU-28 and EFTA countries Iceland, Norway, Switzerland). It is then narrowed to the countries of 2004 EU enlargement wave as these countries belong to the Schengen area since 21 December 2007 (this has had a major impact on emigration from these countries as visa-free access opened the internal EU borders for their citizens).

The research is performed in 3 stages. Firstly, the correlation between income inequality (its change) and emigration rates is calculated. Secondly, the static and dynamic aspect is evaluated, as well as the influence of data delay (lag) on decision-making. Finally, a regression equation is constructed, showing how one variable affects the other.

The analysis identifies the conditions and severity of population income inequality that may influence their emigration decisions. On the one hand, the impact is stronger in the crisis and post-crisis period, and, on the other, in the new EU member states. The phenomenon of this period is intended to be studied more closely in later works. The sensibility of emigration to different conditions like accessibility (i.e. the opportunity to emigrate freely, such as being a member of the Schengen area) and the income gap between countries of origin and destination is a major limitation of the article which should be examined more closely in later works.

1. Background: income inequality, subjective well-being, and emigration

It is often believed that the higher the income of the population is the happier they will be when the other factors are being constant. However, as income and wealth increase, the happiness of the population does not increase *proportionally*, and often not at all. That is evident from the findings of the long-standing household surveys conducted by institutions in the USA, UK and Germany (Weimann et al., 2015).

It appears that happiness (measured as a subjective perception of well-being) is not increasing along with growing income during the long period and it is even decreasing in certain periods (probably in relation to other circumstances). Ifcher et al. (2019), Amendola et al. (2019), Yan and Wen (2020) show that subjective well-being and quality of life decrease due to income inequality. In fact, happiness is more correlated to equality of income (relative wealth) than the increase of income (absolute wealth).

Citizens of different countries have different levels of tolerance when it comes to inequality. The Scandinavians are traditionally considered to be supporters of a state which redistributes welfare; meanwhile, the Americans tend to agree with a significant index of inequality. For this reason, it is evident that changes in inequality would probably have a different impact on the quality of life in different countries and this is precisely why international comparisons are problematic (Weimann et al., 2015). Nevertheless, Alesina et al. (2004) found a significant negative correlation between inequality of income and life satisfaction in the USA and even more significant negative correlation in Europe. Detailed study findings indicate that poor citizens and voters supporting the left-wing politicians demonstrate higher intolerance of inequality, while more productive citizens and voters supporting the right-wing politicians are more indifferent to the distribution of income.

As subjective well-being and quality of life decrease due to income inequality, some of the population may select to emigrate. This happened in Lithuania at the beginning of the 21st century. Since entering the EU (2004), Lithuania has lost almost half a million people (or 14% of the population), and over a quarter of a century, the nation decreased almost by one fourth (Laurinavičius & Laurinavičius, 2017).

What causes emigration if the country's growing economic prosperity does not stop its population? It is claimed that emigration is influenced by issues of trust and subjective well-being and that the latter is primarily linked to relative well-being, that is equality (or inequality), and not absolute wealth (or absolute income). This theoretical assumption can be justified by empirical data. The EU countries which have lost the most of their population also had the highest income inequality (Laurinavičius et al., 2018).

Regarding the data of 21 July 2017 released by a charity organisation "Oxfam" and a financial organisation "Development Finance International", Lithuania had the worst position in a fight with income inequality across the EU. In this study, Lithuania ranked out 83 position of 152 surveyed countries (Latvia – 46, Estonia – 38, Poland – 35) (Laurinavičius et al., 2018). The list has been based on countries' expenditure on education, health and social security, taxes and labour market policies.

The destructive impact of the market on social justice is aptly emphasised by US political philosopher Sandel (2012): "If wealth were the only benefit of being able to buy yachts, sports cars, or luxury vacations, income and wealth disparities would not matter much. However, as things become affordable, such as political power, better health care, homes in a safe neighbourhood, [...] access to an elite rather than a regular school, the gap between income and wealth becomes more and more important. When all good things become goods, money determines everything".

Recent studies show that apart from the increased emigration greater inequality diminishes people's confidence in a fair, equal opportunity society and weakens the sense of community. Greater inequality also has a negative impact on the economy through lower productivity, efficiency, growth and greater instability (Almeida, 2020; Marchand et al., 2020; Schraff, 2020). Lower economic growth has been demonstrated by analysing data from many countries over the long term (Stiglitz, 2013).

In regard to data of Oishi et al. (2011) (US data from 1972 to 2008) inequality makes people unhappy because of the lack of trust and justice. Less confidence and a weaker sense of justice undermine people's life satisfaction in times of higher income inequality.

Quite a few recent articles analyse the reasons and the effects of international emigration from the developing countries to the rich ones (Franc et al., 2019; Phyo et al., 2019; Ivlevs et al., 2019). However, just a few pieces of research investigate whether inequality within one country is a cause for emigration. Among these, there is a study of Kumpikaitė-Valiūnienė and Žičkutė (2017) analysing emigration of 1980–2015 from Lithuania. A qualitative analysis (conducted as a questionnaire on the Internet) was presented in this study. It revealed the main reasons for emigration, and income inequality has been mentioned among other factors, such as too low wages in general, price policies and unemployment rates.

Some studies analyse an inverse causality: how the emigration affects income inequality. The study of Galiano and Romero (2018) examined 215 countries within the period of 1987–2012 and showed that the brain drain seemed to improve the equality in the distribution of income for (some of) the poorest countries in their sample, while for relatively richer countries skilled emigration increased the inequality in the distribution of income. It has been found out that the brain drain could increase per capita income in the native country, while it increased the inequality in the distribution of income.

Uprety (2019) used a panel of 110 developing countries within the period of 1980–2010 and found robust results to different econometrics specifications and subsamples that high-skilled migration increased income inequality in the short-run, while there appeared to be no effect of low-skilled migration on inequality.

2. Methodology: data and model

To make sure the assumptions described in the previous section are correct, the empirical study has been conducted between income inequality, measured as the Gini coefficient, and emigration rates in European countries. The study estimated the correlation between Gini coefficient of equivalized disposable income and emigration rates in 31 European countries, all EU (including the United Kingdom) and EFTA countries (Iceland, Norway, Switzerland).

The wave of 2004 EU enlargement has been selected for further analysis. All those countries since 21 December 2007 belong to the Schengen area. Being a member of Schengen area has a significant impact on emigration as visa-free access opens the internal EU borders. Between 10 EU member states from the enlargement of 2004, only Cyprus, due to its split, is not in Schengen area. However, it has not been excluded from the analysis as the whole 2004 EU enlargement wave was selected to be analysed.

The Gini coefficient measures the inequality among values of a frequency distribution (for example, levels of income). The zero Gini coefficient expresses perfect equality, where all values are the same (for example, where everyone has the same income). A Gini coefficient of one (or 100%) expresses maximal inequality among values (e.g., for a large number of people, where only one person has all the income or consumption, and all others have none, the Gini coefficient will be very close to one) (Silber, 1999).

Happiness, life satisfaction and subjective well-being will not be additionally assessed in this study. Those variables will be represented by income inequality. Factor analysis is needed to be performed in further studies to ascertain what additional relationships exist between these variables.

The emigration rate, in turn, is calculated by dividing the number of long-term emigrants per year by the number of permanent residents of that country at the beginning of the same year.

The numbers of Gini coefficient, long-term emigrants and permanent residents are taken from the Eurostat database. The survey uses the period from 2008 to 2017 (most recent published emigration data).

In order to determine whether there is a relationship between income inequality and emigration rates in European countries, we first calculate a linear Pearson correlation coefficient which ranges from –1 to 1. –1 and 1 indicate no functional relationship, 0 indicates no relationship, and values between –1 and 0 and 0 and 1 indicate negative or positive dependence. The dependency is considered to be averagely strong if the correlation coefficient is higher than 0.5 (or less than –0.5) and very strong if it is greater than 0.7 (or less than –0.7 respectively) (Huber, 2004).

Later, a coefficient of determination is calculated to show what part of the dispersion of one phenomenon (emigration) is explained by another phenomenon (income inequality). The coefficient of determination is obtained by squaring the correlation coefficient.

Correlation analysis is carried out in two aspects that can relatively be called dynamic (time series analysis) and static (cross-sectional analysis):

1. The dynamic dimension of the analysis aims to assess the correlation between income inequality and emigration in the analysed countries, taken individually (hereafter referred to as *individual countries*) *for the whole period of 2008–2017*, for example, what was the correlation between income inequality and emigration in Lithuania in the 2008–2017 period.
2. The static dimension of the analysis calculates the correlation between inequality and emigration in the countries under analysis, taken collectively (hereafter referred to as *all countries*), *for a given year*, e.g. the relationship between income inequality and emigration in all European countries under analysis in 2010.

The analysis is subsequently expanded to use change in income inequality in place of income inequality. This tests the assumption if emigration is more strongly correlated with income inequality or its change measured in percentage points (or percentage), for example, if last year's income inequality was 25 and this year's it is 26, the change would be one percentage point (26 – 25 = 1) or 4% ((26 – 25) / 25 = 0.04).

The aim is then to assess which year of income inequality (or change in income inequality) has a greater impact on emigration, current year or earlier? In other words, the aim is to assess the effect of delay (or lag) in income inequality (its change) on emigration rates.

Once the strongest correlation between income inequality and emigration rates is found for a particular group of countries, all the steps of analysis described above are repeated with the target group of countries.

The final step in the study is regression analysis, the determination of the regression equation and the construction of the predictive model. Income inequality is considered as the independent variable, and emigration rate is dependent. The hypothesis is tested on how emigration changes as income inequality changes. For that purpose, the calculation is first carried out on average income inequality in individual countries and average annual emigra-

tion within the period from 2008 to 2017. These two variables are then set up in a regression equation (Huber, 2004).

Finally, the significance of the regression is tested. The Student's t-test is used for this. The aim is to determine whether the calculated value of t is less than 0.05. If so, the resulting regression is statistically significant, if not, it is insignificant (Huber, 2004).

3. Results and discussion

3.1. Correlation analysis in European countries

Initially, the dynamics of income inequality and emigration rates *in individual countries for the whole period of 2008–2017* were analysed. It was determined that in the period of 2008–2017 the correlation between income inequality and emigration rates was positive in 19 countries and negative in 12 countries out of 31 European countries surveyed (Table 1). A strong positive (more than 0.7) correlation occurred in 6 countries, a strong negative (less than –0.7) in only 1, a medium-strong positive (from 0.5 to 0.7) in another 5, and medium-strong negative (from –0.5 to –0.7) in 2 countries. The correlation was weaker (positive or negative) (see Appendix for detailed results) in the remaining countries.

Analysis of the dependence between the same indicators *in all countries for a given year*, the correlation coefficients are positive but weak (ranging from 0.1 to 0.31) in all studied years (2008–2017). It means that the relationship between income inequality and emigration is regular and not accidental.

It can also be questioned that emigration is not influenced by income inequality itself but by its change. For that purpose, correlation coefficients between changes in income inequality (in percentage points and percentage) and emigration *in individual countries* have been calculated. The results obtained are shown in Table 1.

First of all, the results are very similar, regardless of how a change in income inequality is measured in percentage points or in percentage (Table 1). Second, in both cases, the correlation is weaker than calculating the correlation simply between income inequality and

Table 1. Correlation coefficients between income inequality (or its change) and emigration in 2008–2017 in 31 European countries

		Correlation coefficient					
		Positive strong	Positive medium	Positive weak	Negative weak	Negative medium	Negative strong
		0.7 to 1	0.5 to 0.7	0 to 0.5	0 to –0.5	–0.5 to –0.7	–0.7 to –1
Gini and emigration	Number of countries	6	5	8	9	2	1
Gini change pp and emigration		1	2	14	12	1	1
Gini change % and emigration		0	3	14	12	2	0

emigration, so it cannot be claimed that not income inequality itself but its change would have any additional effect on emigration.

Moreover, if we calculate not the correlation between the change in income inequality and emigration *in individual countries for the whole period of 2008–2017*, but the correlation between the change in income inequality and emigration *in all countries for a given year* (static analysis rather than dynamic), we see that, in contrast to the correlation between income inequality and emigration, which, as mentioned above, was positive but weak in every year under analysis (2008–2017), the change in income inequality (however measured in percentage points or percentage) does not have such an unambiguous effect on emigration. The correlation was positive only in 4 years out of 10 years analysed, and in the remaining six years, it was negative. In addition, correlation coefficients were weak in all years except two.

Therefore, in a static analysis as in a dynamic one, it cannot be stated that the change in income inequality (in percentage points and percentage) would provide any additional explanation for emigration.

Another question to ask is how quickly income inequality (or change in income inequality) affects people's decisions about emigration. It is quite likely that it will take some time to make a decision, so it is appropriate to analyse how emigration is affected by income inequality (or its change) *of the previous year*. For that purpose, correlation coefficients between *individual countries'* income inequality (its change) and emigration rates have been calculated by taking data from *previous year's income inequality (its change)* and *current year's emigration* indicators. The obtained results are shown in Table 2.

Analysing the impact of income inequality of previous year on the emigration of the current year the correlation coefficients are high or medium-strong (both positive and negative) in more than a half of countries (Table 2). This is why it can be stated that residents' decisions about emigration are influenced by current and previous year's income inequality. On the other hand, the effect of changes in income inequality of previous years (both in percentage points and in percentage) on emigration in most countries is weak, much like evaluating previously discussed data of the current year.

Table 2. Correlation coefficients between income inequality (or its change) *lagged by 1 year* and emigration in 2008–2017 in 31 European countries

Gini coefficient lagged by 1 year		Correlation coefficient					
		Positive strong	Positive medium	Positive weak	Negative weak	Negative medium	Negative strong
		0.7 to 1	0.5 to 0.7	0 to 0.5	0 to –0.5	–0.5 to –0.7	–0.7 to –1
Gini and emigration	Number of countries	7	4	9	5	3	3
Gini change pp and emigration		1	4	17	8	1	0
Gini change % and emigration		1	4	17	8	1	0

For maintaining the consistency of the analysis, it is necessary to discuss the static rather than the dynamic dimension of the analysis by calculating the correlation between income inequality (its change) and emigration in all countries for a given year. The results show that, similarly to the correlation between current year's income inequality and emigration, the correlation between previous year's income inequality and emigration of the current year in each of the ten years analysed (2008–2017) was positive but weak. The change in income inequality of the previous year (measured in percentage points or percentage) had no unambiguous effect on emigration. Out of 10 analysed years, the correlation was positive in 6 years and negative in the remaining 4 years. In addition, in all years, except two, correlation coefficients were weak.

Finding out that the delay (lag) in the income inequality data does not have a significant effect on the study results, it can be focused on the differences between the group of countries where income inequality (does not matter whether of the current year or previous) had a strong impact on emigration and other groups of countries where this impact was weak. It is seen that there were 14 countries where the effect of income inequality on emigration in 2008–2017 was medium or very significant (Table 1). In 11 of them the effect was positive in 3 it was negative. It is interesting that 6 of those countries are new members of the EU. In other words, six countries of the 13 new EU members experienced the medium or very strong impact of income inequality on emigration.

This effect is even more pronounced when analysing the impact of income inequality of the previous year on the emigration of the current year (Table 2). A highly and medium-strong correlation was found in 17 countries (11 positives and six negatives) and nine countries out of those, 17 were the new EU members. In other words, even 9 out of 13 new EU members had a high or medium-strong correlation between income inequality of the previous year and emigration of the current year. This phenomenon is worth to be examined more precisely.

Applying a static rather than a dynamic dimension of the analysis, i.e. calculating the correlation between income inequality (its change) and emigration in all new EU member states for a given year shows that as it was stated in the case of all countries the same is for the new EU members: positive correlation coefficients are obtained in each of the ten years (2008–2017). However, in contrast to all countries where all correlation coefficients were weak (ranged from 0.1 to 0.31), the correlation coefficients of the new EU members were much higher and ranged from 0.33 to 0.71. Even in 4 years out of 10, the correlation coefficients were highly or medium strength and all of those years were consecutive and covered the crisis and post-crisis period (2008–2011). Thus, it is expedient to examine the phenomenon of this period in separate scientific works. This study will confine itself to the preliminary conclusion that the effect of inequality on emigration can only be strong in certain limits. For example, factor analysis (also analysing the impact of GDP change) would help to determine at what times (or under what conditions) the effect of income inequality on emigration is significant and when not so much.

By supplementing the analysis with the aforementioned data lag, we would not obtain further conclusions in this case.

3.2. Correlation analysis in new EU member states

We will take a closer look at the impact of income inequality on emigration in the new EU member states, i.e. the group of countries where the correlation between income inequality and emigration was strongest.

The wave of 2004 EU enlargement has been selected for further analysis as all those countries since 21 December 2007 belong to the Schengen area while the other three countries (Romania, Bulgaria, Croatia which entered the EU later) are not yet Schengen area members. After all, being a member of the Schengen area has a major impact on emigration as visa-free access opens the EU borders. Only Cyprus, due to the split, is not in Schengen area out of the ten new EU members being in the bloc from 2004. However, it has not been excluded from the analysis as the whole 2004 EU enlargement wave was selected to be analysed.

Maintaining the consistency of the previous analysis, the correlation coefficients for these ten discussed countries were calculated. First of all, it is worth noting the static aspect of the analysis when calculating the correlation between income inequality (its change) and emigration *in all countries for a given year*. The results show that the correlation between income inequality and emigration in each of the ten years analysed (2008–2017) was positive. Even in 9 years out of 10 analysed years, the correlation was medium or highly strong (the weakest was in 2014, and it was 0.49). The correlation coefficients for the whole period are shown in Table 3:

Table 3. Correlation coefficients between income inequality and emigration in 2008–2017 in 10 new EU member states (enlargement of 2004)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Correlation coef.	0.55	0.66	0.78	0.68	0.53	0.54	0.49	0.65	0.67	0.65

The situation is similar when analysing data with delay but the correlation coefficients are slightly weaker (Table 4):

Table 4. Correlation coefficients between income inequality *lagged by 1 year* and emigration in 2008–2017 in 10 new EU member states (enlargement of 2004)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Correlation coef. lagged by 1 year	0.37	0.69	0.74	0.83	0.46	0.44	0.47	0.62	0.65	0.67

Thus, in the new EU member states, in contrast to the previously analysed group of 31 European countries, the correlation between income inequality and emigration was strong not only within the crisis and post-crisis period, but in the whole analysed period (2008–2017) (Table 3). In addition, emigration was affected not only by income inequality of the current year but also by income inequality of the previous year (Table 4).

The correlation coefficient between average income inequality and emigration rates in 10 new EU member states have been further analysed. For that purpose, rates of average income inequality of the ten new EU members from 2008 to 2017 have been calculated at first. They are presented in Figure 1:

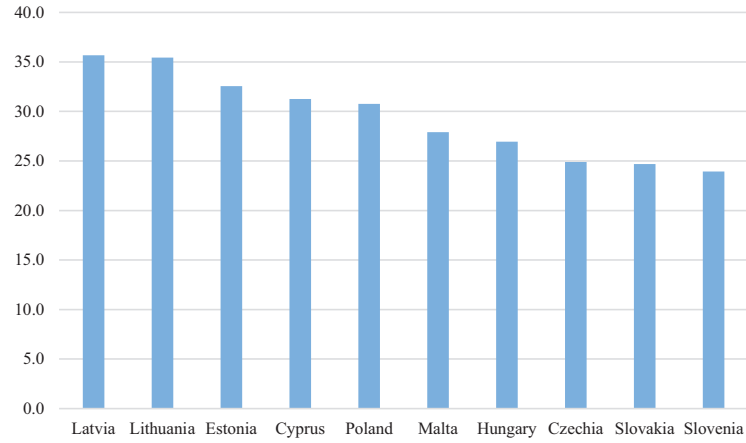

Figure 1. Average income inequality in 10 new EU member states (enlargement of 2004) in 2008–2017 measured by Gini coefficient

It can be seen that highest average income inequality in 2008–2017 was recorded in Baltic states and the lowest was in Visegrad group countries and Slovenia (Figure 1).

Then the total emigration rates (note: the correlation will be the same as with the average emigration rates) of the 10 new EU members were calculated for the period of 2008–2017. The results are presented in Figure 2:

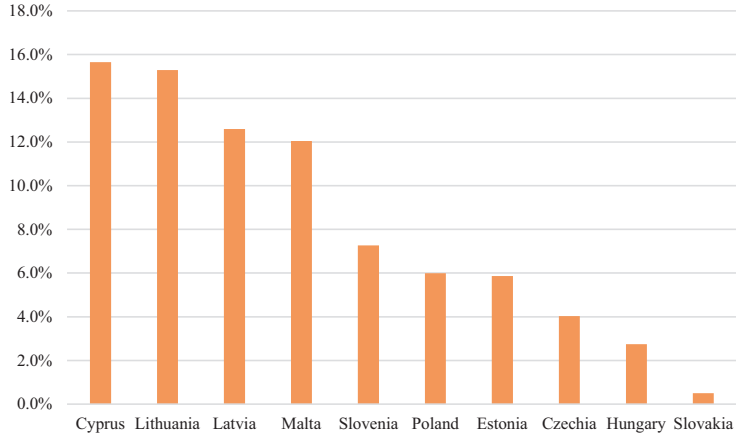

Figure 2. Cumulative emigration in 10 new EU member states (enlargement of 2004) in 2008–2017 in percentage of total population

Figure 2 shows the proportion of the population of the ten new EU member states that emigrated in 10 years. Together it means that by dividing the above numbers by 10 an average annual emigration rate would have been received. It can be seen that the highest total (and at the same time average annual) emigration was observed by two of the three Baltic States. Lowest emigration was in the countries of the Visegrad group. It is clear that a similar

distribution of countries in the diagrams of average income inequality and total (or average) emigration (Figures 1 and 2) leads to a strong correlation coefficient between the two variables, respectively.

As already mentioned, calculating the correlation with income inequality is irrelevant, which emigration indicator – average or total – will be used. The result will be the same: a strong positive correlation is received with a correlation coefficient of 0.67. Squared the correlation coefficient, we get a coefficient equal to 0.45 (determination coefficient), which shows that even 45% of average annual emigration can be explained by using only income inequality data.

3.3. Regression analysis

The relationship between both measures, the average income inequality in 2008–2017 measured by the Gini coefficient and the average annual emigration in the ten new EU members over the same period, is shown in Figure 3:

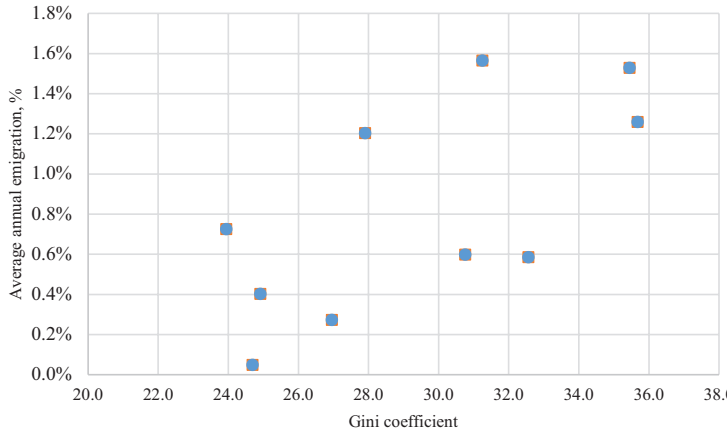

Figure 3. Average income inequality and average annual emigration in 10 new EU member states (enlargement of 2004) in 2008–2017

With this data, we construct a regression equation in which the independent variable is the average income inequality, and the dependent variable is the average annual emigration. We get:

$$y = 0.08x - 1.6, \quad (1)$$

where: y is average annual emigration in percentage; x is average income inequality measured as Gini coefficient. The regression equation shows that as income inequality increases by one percentage point (under Gini), average annual emigration increases by 0.08 percentage point. In other words, out of every million of the country's population, this represents an additional loss of 800 inhabitants a year.

On the contrary, when income inequality is reduced by one percentage point (under Gini), average annual emigration is reduced by 0.08 percentage point. Thus, the equation also suggests that emigration would stop when the Gini coefficient reached 20% meaning if

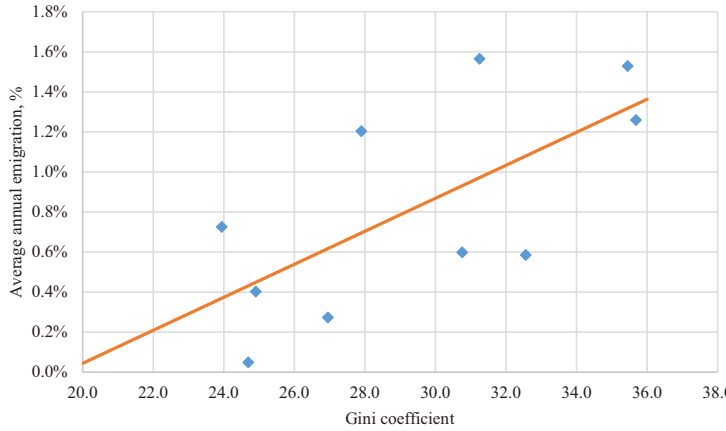

Figure 4. Average income inequality and average annual emigration in 10 new EU member states (enlargement of 2004) in 2008–2017: linear trend

emigration depended solely on income inequality (Figure 4). Emigration, certainly, also depends on other conditions as the already mentioned accessibility (i.e., in this case, emigration is facilitated by countries belonging to the Schengen area and open borders) and a significant difference in income between the countries of origin and destination. Those assumptions will be analysed in further researches.

Student's t-test (two-sided) has been used to determine the significance of the regression. The value equal to $3.28 \times 10^{-14,}$ indicating that the regression is statistically significant is obtained.

Conclusions

Findings of multiple analysed articles show that happiness is more correlated to equality of income (relative wealth) than the increase of income (absolute wealth). This is why income inequality as a measure of relative wealth can have an impact on different aspects of life regarding people happiness, life satisfaction, subjective well-being, and incentives to emigrate.

In the article correlation and regression analysis are used to determine the relationship between the analysed social phenomena. The research starts with the analysis of links between the Gini coefficient of equivalized disposable income and emigration rates in 31 European countries (EU-28 and EFTA countries Iceland, Norway, Switzerland). It is then narrowed to the countries of 2004 EU enlargement wave as these countries belong to the Schengen area since 21 December 2007 (this has had a major impact on emigration from these countries as visa-free access opened the internal EU borders for their citizens).

The research was performed in 3 stages. Firstly, the correlation between income inequality (its change) and emigration rates was calculated. Secondly, the static and dynamic aspect was evaluated, as well as the influence of data delay (lag) on decision-making. Finally, a regression equation was constructed, showing how one variable affects the other.

The results of the study show that the correlation between *change* of income inequality (in percentage points or percentage) and emigration is weaker than calculating the correlation just between income inequality and emigration. Therefore, it cannot be stated that *change* in income inequality would have any additional effect on emigration.

The analysis of the dependency of income inequality and emigration indicators in *all countries for a given year* (a static aspect of the analysis), it is seen that the correlation coefficients are positive but weak (ranging from 0.1 to 0.31) in all studied years. It means that the relationship between income inequality and emigration is regular and not accidental.

In contrast to the case of all countries, the correlation coefficients of the 13 new EU members are much higher and range from 0.33 to 0.71. In addition, even in 4 out of 10 years correlation coefficients were highly or medium-strong. All those years were consecutive and covered the crisis and post-crisis period (2008–2011). The phenomenon of this period is intended to be studied more closely in later works keeping in mind the conclusion that the impact of inequality on emigration can be strong only within certain limits.

The usage of *previous year's* income inequality data calculating correlation with rates of *current year's* emigration did not significantly influence the study results either. This is why it can be stated that residents' decisions about emigration are influenced by current and previous year's income inequality.

Correlation between average income inequality and average annual emigration in the new EU member states (2004 enlargement wave) within 2008–2017 is strong and positive, and the correlation coefficient is 0.67. Squared the correlation coefficient, we get a coefficient of determination of 0.45, showing that even 45% of average annual emigration can be explained by using only income inequality data.

Consequently, in the new EU member states, in contrast to the group of 31 European countries analysed previously, the correlation between income inequality and emigration was strong not only in the crisis and post-crisis period but throughout all the analysed period (2008–2017). In the group of new EU member states, the same as in the group of 31 European countries analysed earlier; emigration was affected not only by income inequality of the current year but also by the income inequality of previous year.

Highest average income inequality in 2008–2017 was recorded in Baltic states, and the lowest was in Visegrad group countries and Slovenia. It can be seen that the highest total (and at the same time average annual) emigration was observed in two of the three Baltic States (Lithuania and Latvia). Lowest total emigration was in the countries of the Visegrad group. The similar distribution of countries in terms of average income inequality and total (or average) emigration results in a strong correlation coefficient between the two variables, respectively.

The regression equation shows that when income inequality in the new EU member states (2004 enlargement wave) increases by 1 percentage point (under Gini), average annual emigration increases by 0.08 percentage point. It can also be stated that emigration would stop when the Gini coefficient reached 20% value, providing that emigration depended solely on income inequality.

Factor analysis (also analysing the impact of GDP change) in later works would help to determine at what times (or under what conditions) the effect of income inequality on

emigration is significant and when it is not so meaningful, either, how accessibility affects emigration (i.e. the opportunity to emigrate freely, such as being a member of the Schengen area) and the income gap between countries of origin and destination.

Finally, more detailed analysis of the emigration problem and its possible links to income inequality would allow economists to assess *a priori* the potential of various measures suggested in practice and would also contribute to a more detailed study of the scientific aspects of emigration and income inequality.

References

Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics*, *88*, 2009–2042. https://doi.org/10.1016/j.jpubeco.2003.07.006

Almeida, V. (2020). Income inequality and redistribution in the aftermath of the 2007–2008 crisis: the U.S. case. *National Tax Journal*, *73*(1), 77–114. https://doi.org/10.17310/ntj.2020.1.03

Amendola, A., Dell'Anno, R., & Parisi, L. (2019). Happiness and inequality in European countries: Is it a matter of peer group comparisons? *Economia Politica*, *36*(2), 473–508. https://doi.org/10.1007/s40888-018-0130-6

European Values Study. (2016). https://europeanvaluesstudy.eu/

Eurostat. (2020). https://ec.europa.eu/eurostat

Franc, S., Casni, A. C., & Barisic, A. (2019). Determinants of migration following the EU enlargement: a panel data analysis. *South East European Journal of Economics and Business*, *14*(2), 13–22. https://doi.org/10.2478/jeb-2019-0010

Galiano, A., & Romero, J. G. (2018). Brain drain and income distribution. *Journal of Economics*, *124*(3), 243–267. https://doi.org/10.1007/s00712-017-0576-y

Huber, P. J. (2004). *Robust statistics*. John Wiley & Sons.

Ifcher, J., Zarghamee, H., & Graham, C. (2019). Income inequality and well-being in the U.S.: Evidence of geographic-scale- and measure-dependence. *Journal of Economic Inequality*, *17*(3), 415–434. https://doi.org/10.1007/s10888-018-9404-z

Ivlevs, A., Nikolova, M., & Graham, C. (2019). Emigration, remittances, and the subjective well-being of those staying behind. *Journal of Population Economics*, *32*(1), 113–151. https://doi.org/10.1007/s00148-018-0718-8

Silber, J. (1999). *Handbook of income inequality measurement*. Kluwer Academic. https://doi.org/10.1007/978-94-011-4413-1

Kumpikaitė-Valiūnienė, V., & Žičkutė, I. (2017). Emigration after socialist regime in Lithuania: Why the West is still the best? *Baltic Journal of Management*, *12*(1), 86–110. https://doi.org/10.1108/BJM-02-2016-0053

Laurinavičius, A. [Antanas], & Laurinavičius, A. [Algimantas]. (2017). Emigration: a price of inequality or a breach of social contract? In *Conference Proceedings "Contemporary Issues in Business, Management and Education '2017"* (pp. 280–288). Vilnius Gediminas Technical University. https://doi.org/10.3846/cbme.2017.018

Laurinavičius, A. [Antanas], Laurinavičius, A. [Algimantas], & Smilga, E. (2018). *Lietuvos strateginio iškilimo gairės*. Vilniaus universiteto leidykla.

Marchand, Y., Dubé, J., & Breau, S. (2020). Exploring the causes and consequences of regional income inequality in Canada. *Economic Geography*, *96*(2), 83–107. https://doi.org/10.1080/00130095.2020.1715793

Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological Science*, *23*, 86–92. https://doi.org/10.1177/0956797611420882

Phyo, E. E., Goto, H., & Kakinaka, M. (2019). International migration, foreign direct investment, and development stage in developing economies. *Review of Development Economics*, *23*(2), 940–956. https://doi.org/10.1111/rode.12577

Piketty, T. (2013). *Le capital au XXI siècle*. Éd. du Seuil.

Rousseau, J.-J. (2018a). *Considérations Sur Le Gouvernement de Pologne, Et Sur Sa Réformation Projettée*. Wentworth Press.

Rousseau, J.-J. (2018b). *Du Contrat Social, Ou, Principes Du Droit Politique*. Wentworth Press.

Sandel, M. J. (2012). *What money can't buy: the moral limits of markets*. Farrar, Straus and Giroux.

Schraff, D. (2020). Is the member states' curse the EU's blessing? Inequality and EU regime evaluation. *JCMS-Journal of Common Market Studies*. https://doi.org/10.1111/jcms.13027

Statistics Lithuania. (2020). [Official Statistics Portal]. https://osp.stat.gov.lt/

Stiglitz, J. E. (2013). *The price of inequality*. Penguin Books. https://doi.org/10.1111/npqu.11358

Uprety, D. (2019). Does skilled migration cause income inequality in the source country? *International Migration*, *58*(4), 85–100. https://doi.org/10.1111/imig.12661

Weimann, J., Knabe, A., & Schoeb, R. (2015). *Measuring happiness. The economics of well-being*. MIT Press. https://doi.org/10.7551/mitpress/10036.001.0001

Yan, B., & Wen, B. (2020). Income inequality, corruption and subjective well-being. *Applied Economics*, *52*(12), 1311–1326. https://doi.org/10.1080/00036846.2019.1661953

Appendix

Correlation coefficients in 31 European countries between income inequality measured as Gini coefficient (and its change in percentage points and percentage) and emigration in 2008–2017 are shown in Table A1.

Table A1. Correlation coefficients in 31 European countries between income inequality (and its change in percentage points and percentage) and emigration in 2008–2017

2008–2017	Correlation coefficients		
	Gini and emigration	Gini change pp and emigration	Gini change % and emigration
Belgium	–0.68	–0.44	–0.44
Bulgaria	0.83	0.54	0.52
Czechia	0.37	0.18	0.18
Denmark	0.67	–0.18	–0.19
Germany	0.34	–0.18	–0.18
Estonia	0.23	–0.49	–0.49
Ireland	0.20	0.19	0.19
Greece	0.81	0.50	0.51
Spain	0.16	–0.23	–0.23

End of Table A1

2008–2017	Correlation coefficients		
	Gini and emigration	Gini change pp and emigration	Gini change % and emigration
France	–0.58	–0.36	–0.38
Croatia	–0.85	0.28	0.27
Italy	0.77	–0.04	–0.04
Cyprus	0.86	0.44	0.45
Latvia	0.55	–0.33	–0.32
Lithuania	0.37	–0.15	–0.16
Luxembourg	0.66	0.23	0.23
Hungary	0.90	–0.05	–0.06
Malta	0.59	0.05	0.03
Netherlands	–0.46	0.50	0.49
Austria	–0.10	0.05	0.04
Poland	–0.44	0.10	0.09
Portugal	–0.39	0.69	0.68
Romania	0.12	–0.68	–0.67
Slovenia	–0.40	–0.45	–0.45
Slovakia	–0.33	–0.16	–0.15
Finland	–0.48	0.26	0.26
Sweden	–0.33	–0.56	–0.54
United Kingdom	0.68	0.18	0.17
Iceland	0.77	0.02	0.02
Norway	0.16	0.31	0.30
Switzerland	–0.49	0.23	0.23